Prediction of Strategy Usage by Adults with Aphasia

Management of aphasia often focuses on training augmentative communication strategies such as communication books, computerized systems, gestures, writing, or drawing. While many patients are able to acquire a targeted skill in a structured format, many patients do not successfully use the trained skill in more functional situations (Ballard & Tompson, 1999; Coelho, 1990; Purdy, Duffy & Coelho, 1994; Robson, Pring, Marshall, Morrison, & Chiat, 1998; Rostron, Ward & Plant, 1996; Yoshihata and colleagues, 1998). Purdy, Duffy, and Coelho (1994) performed a study examining use of symbols trained in verbal, gestural, and communication board modes. They found that despite having acquired these symbols during specific training, subjects did not use them on a functional communication task. Specifically, if their first attempt to communicate the contents of a picture failed, they did not attempt to switch to a different mode to convey the information. Use of augmentative communication strategies requires a number of cognitive skills. Individuals must first recognize that their initial communicative attempt was not successful, then they must determine a different way to get their point across. Recognition of one's errors and generation of solutions to correct the error is a basic problem solving skill that requires the ability to think flexibly. If a person lacks cognitive flexibility, then they are likely to continue with the method that was proven to be unsuccessful.

Training alternative communication strategies can be a time consuming project; thus, it would be beneficial if speech-language pathologists could predict, apriori, how a patient may respond to this type of treatment approach. This is particularly important given today's health care system and reimbursement schedules.

The purpose of this study was:

1. Develop a means of examining cognitive flexibility using a standardized test of communication (Communicative Abilities of Daily Living),
2. To determine if trained symbol usage could be predicted via this cognitive flexibility score, and;
3. To determine the relative contribution of the overall severity of aphasia on the prediction of trained symbol usage.

METHOD

Subjects

Fifteen nonfluent aphasic subjects participated in this study. All subjects sustained a single left hemisphere stroke, were right handed, spoke English as a primary language, and passed screening tests for vision and hearing. The mean age was 61.9 years, mean time post onset was 39.7 months, and mean educational level was 13.8 years.

Procedure

Total CADL

The Communicative Abilities of Daily Living (CADL) was administered to each subject to determine functional communication skill. The test was initially scored according to test instructions. Responses were then reanalyzed to obtain the cognitive flexibility score.

CADL Cognitive Flexibility Score

Because this project examined expressive symbol usage, 20 items that primarily addressed receptive language or that simply required pointing to information in a picture were omitted from the analysis. Thus, analysis was based on responses to the remaining 48 items. The mode of

response was recorded (verbal, gestural, pointing, writing). The number of opportunities to switch to another modality (a failed initial communicative attempt) and the number of successful switches were tallied. The cognitive flexibility score was the ratio of the number successful switches to the total number of opportunities to switch.

Symbol Usage Training

A detailed description of the training procedure can be found elsewhere (Purdy, Duffy, & Coelho, 1994). In summary, a multiple baseline across behaviors design was used to train 20 target symbols in three communicative modalities: verbal, gestural, and a communication board. Training began with the communication board. When subjects attained 80% accuracy, training progressed to gestures, then to the verbal modality. In order to progress to the referential communication task, subjects had to attain 80% accuracy in at least two of the three modalities.

Referential Communication Task

This task consisted of describing 15 action pictures to a naive partner. Each picture contained two to three of the previously trained symbols, for a total of 33. Subjects were instructed to use whatever means necessary to describe the picture

Referential Communication Cognitive Flexibility Score

The number of opportunities to switch to another modality (a failed initial communicative attempt) and the number of successful switches were tallied. The cognitive flexibility score was the ratio of the number successful switches to the total number of opportunities to switch.

RESULTS

Refer to Table 1 for subjects' performance on the Communicative Abilities in Daily Living (CADL), Porch Index of Communicative Abilities (PICA), Cognitive Flexibility scores (CogFlex), the total number of trained symbols used on the Referential Communication Task (RefCom), and the number of symbols used in each modality.

A regression analysis resulted in a significant correlation using the total number of symbols used on the referential communication task as the criterion variable, and the total CADL score as the prediction variable (B=.53, p=.04). However, when severity of aphasia was factored in, the predictive value of the CADL was no longer significant (B=.15, p=.56). Rather, the significant predictor became the PICA (B=.60, p=.04).

A second regression analysis was performed using the cognitive flexibility score for the referential communication task as the criterion variable, and the cognitive flexibility score from the CADL as the predictor variable. This resulted in a significant correlation (B=.83, p=.000) . Again, the overall PICA score was added to control for the severity of the aphasia. The correlation between the cognitive flexibility scores on the referential communication task and the CADL remained significant (B=.76, p=.001). The relative contribution of the PICA was no longer significant (B=-.17, p=.35).

DISCUSSION

The total CADL score was not predictive of performance on the referential communication task. Rather, there was a significant correlation between overall language function (PICA) and the referential communication task. This is likely due to the fact that the majority of the responses on the referential communication task were verbal.

Typically, use of augmentative communication strategies is required when verbal attempts fail. Thus, to truly determine the likelihood of using trained symbols, switching behavior (cognitive flexibility) should be considered. When cognitive flexibility was examined

on the CADL and the referential communication task, a significant predictive correlation was found, and remained strong when severity of aphasia was statistically controlled.

Although the CADL taps strongly into language functions, it affords clinicians the opportunity to look at communication more broadly since it allows nonverbal responses and uses more functional communication tasks and situations. However, it may be even more useful in obtaining information regarding clients' cognitive functioning and in guiding our therapy if clinicians were to examine modes of response and error patterns.

Results of the current study suggest the cognitive flexibility score on the CADL may indeed shed some light on whether patients would benefit from specific symbol or augmentative communication training. This is not to imply that if patients receive a low cognitive flexibility score that all attempts at training should be abandoned; rather, it could help the clinician develop more realistic goals and may guide treatment.

Table 1.

	Total CADL	PICA	CADL CogFlex #switch/#opp	RefCom CogFlex #switch/#opp	Total RefCom (N=33)	RefCom Verbal	RefCom Gesture	RefCom ComBk
Mean	84	40.4	25.4	26.5	17.5	11.3	5.2	1
S.D.	16.4	10.7	16.3	17.1	6.3	6.3	4.5	4.5
Range	57-115	25-63	8-63	0-59	7-27	0-25	0-15	0-5

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